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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/933,668	08/22/2001	Hanae Nakatani	46271	6697

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MANELLI DENISON & SELTER
2000 M STREET NW SUITE 700
WASHINGTON, DC 20036-3307

EXAMINER	
DICUS, TAMRA	

ART UNIT	PAPER NUMBER
1774	

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/933,668	NAKATANI ET AL.	
	Examiner	Art Unit	
	Tamra L. Dicus	1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7-10,12,13 and 15-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7-10,12,13 and 15-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

The rejection over claim 14 is withdrawn as applicant cancelled the claim prior.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 17 recites the limitation "the inorganic fine particles" in line 2. There is insufficient antecedent basis for this limitation in the claim. Inorganic fine particles are not included in claim 1, from which claim 17 depends.

4. Claims 1(amended), 6-10, 12, 15-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,677,067 to Kojima et al., in view of USPN 5612281 to Kobayashi et al. USPN 5,541,002 to Hosoi et al. and USPN 6,183,851 to Mishima.

Kojima discloses several examples of ink jet recording sheets (printing material) comprising a base paper covered on both sides by a polyolefin resin of low and high density polyethylene (same polymers as applicant uses) at col. 7, lines 40-44, with the polyolefin resin-coated paper support (base) having a thickness of 50-300 microns (see col. 7, line 35), where a thickness of the resin coated layer has a thickness of 5-50 microns (see col. 7, line 67), meeting the requirements of claim 1 values of 8 or more and less than 20 microns. The recording sheet

further comprises an ink receptive layer on either one or both sides of the paper (see col. 4, lines 50-54), containing inorganic fine particles of antistatic agents or pigments like silica (see col. 4, line 41; col. 5, line 66; col. 13, line 67), a hydrophilic binder of polyvinyl alcohol, and an amphoteric surfactant in an amount of 0.1 to 5% by weight at col. 7, lines 15-19 meeting the limitations of claims 1 and 8 at col. 9, lines 20-32. Kojima further discloses the polyethylene resins used on the base paper may be a low-density polyethylene, a medium-density polyethylene, a high-density polyethylene or a mixture thereof and further explains the low-density polyethylene has a density of 0.915-0.930 g/cm^3 and the high-density polyethylene has a density of 0.950 g/cm^3 or higher and depending on how the polyethylene resins are used, alone or in combination, it is possible to have different densities at col. 5, lines 15-21. Since the polymer resins of claim 1 are the same and have a base paper covered in the same polyolefin resin on both sides of the paper (this is equivalent to the polyolefin resin layer at the opposite surface) with the same thickness as per instant claim 1, ranging between 50-300 microns at col. 4, lines 58-62 and at col. 5, lines 31-35 the thickness of the resin coated paper on only one side or both sides is between 5-50 microns, which is included in applicant's claimed range of 5-50 microns; therefore, the relation equation {(B+C)/A} will equal 0.15 to 0.45 or 0.2 to 0.4 (to new instant claim 15), and the ratio of polyolefin resin layer thicknesses on or opposite the ink receptive layer surface of claim 1 will be less than 1. With regards to the base paper density between 0.60 and 1.05 g/m^3, Kojima teaches a support may be of woodfree paper, nonwoven fabrics, or natural pulp (same as applicants) at col. 9, lines 8-15 and col. 10, lines 38-53. Such a property as the density of the base paper is result effective and therefore optimizable. Basis weight and thickness directly effect density. Essentially, the thicker the paper, the higher the density, and if

one so desires to manufacture a base paper between 0.60 and 1.05 g/m^3, one would definitely be motivated by obvious reasons such as cost, a thinner paper will provide a cost savings. See further reference of Hosoi to ink jet papers teaching density of papers may very well range between 0.60 and 1.05 g/cm^3, (also referring to new claim 20) at col. 3, lines 44-46 Hosoi teaches density 0.70 to 0.90 g/cm^3. Also, Kojima teaches the base paper may be calendered to improve surface smoothness at col. 10, lines 50-55. It would have been obvious to one of ordinary skill in the art to modify the paper of Kojima to include paper having a density between 0.60 and 1.05 g/cm^3, because Hosoi teaches density of the paper is conventional for ink jet papers as cited above.

Kojima fails to expressly disclose fumed silica in an amount of 50 to 90 % by weight, as per amended claim 1 or new claim 17 from 13 to 30 g/m^2 (assuming the inorganic particle is silica), and Kojima is further silent to fumed silica having a particle size of 5 nm to 50 nm as in amended claim 1 or 5 to 20nm (claim 10 or new instant claim 16). Kobayashi, an analogous art, teaches processing inorganic fine inorganic silica in a dry process to produce "fumed silica". Kobayashi explains using a flame hydrolysis process in which silicon halide is hydrolyzed in a high-temperature gas phase to obtain silica containing no water, and an arc process in which siliceous sand and coke are heated, reduced and vaporized by means of arc in an electric furnace, followed by oxidizing with air, to obtain anhydrous silica at col. 6, lines 27-39. The silica fine particles are 3 to 10 nm and 10 to 100 nm, shown in col. 5, line 50 and col. 6, lines 56-57. This is in applicant's claimed range of 5 to 20 nm, as in claims 10 and new claim 16. Further regarding claim 10, Kobayashi teaches a BET in the range of 100 to 250 m2/g, meeting Applicant's range of 100 to 400 m2/g. It would have been obvious to one of ordinary skill in the

art to modify Kojima's ink jet recording sheet to include fumed silica size of 5 to 20 nm because Kobayashi teaches fumed silica easily forms a three-dimensional structure having particularly high void volume which is required for excellent ink absorptivity (col. 5, lines 1-15). See also Comparative Example 3 and Example 1 providing conventional weight percentage fumed silica falling within Applicant's claimed range. Further, it would have been obvious to one of ordinary skill in the art to further optimize the amount of particles added to provide fumed silica in the amount of 50 to 90 wt. % as in claim 5, and in claim 1 because Kobayashi teaches fumed silica is required for excellent ink absorptivity (col. 5, lines 1-15) and teaches using conventionally 50 and 75 wt. % fumed silica as in Example 1 and Comparative Example 3. Further Kobayashi explains silica is a major component within a color-receptive layer at col. 8, lines 32-35. In regards to the amount of inorganic fine particles from 10 to 35 g/m2 or 13-30 g/ m2 as in claims 1 and 17, Kojima does not teach. However, Mishima teaches an ink jet image recording medium. At col. 11, lines 34-37 teaches inorganic pigments are added singly or in admixture in an amount between 0.1 to 20 g/m2, falling within Applicant's range. See also col. 9, lines 30-35 teaching inorganic pigment weight percentage between 5 and 95 wt. % (falling within Applicant's range). The preferred inorganic pigment of Mishima is fumed silica, see col. 8, lines 34-38. It would have been obvious to one of ordinary skill in the art to employ inorganic pigment and/or fumed silica in a coating amount as recited in the claims because Mishima teaches the coating amounts are conventional to use as cited above.

Regarding claim 12, Kojima teaches a subcoat (equivalent to subbing) layer on a support with an ink-receiving layer over it at col. 8, lines 20-25, the subcoat layer may be of a water-soluble polymer or latexes (same as Applicant). While Kojima is silent to the coating weight of

the subbing layer of 10 to 500 mg/m2 , the coating weight is optimizable. It would have been obvious to one of ordinary skill in the art to modify the basis weight range, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272. Coating weight directly effect density.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,677,067 to Kojima et al., in view of USPN 5612281 to Kobayashi et al. and USPN 5,541,002 to Hosoi et al., USPN 6,183,851 to Mishima, and further in view of USPN 6,165,606 to Kasahara et al.

Kojima is relied upon above, but is silent to adding boric acid as instant claim 13. Kasahara teaches at col. 15, lines 5-20 the ink-jet recording layer sheet with a void-containing layer, has a hardening agent that is cross-linkable with the hydrophilic binder polyvinyl alcohol, to improve the film forming properties of avoid-containing layer, the water-resisting properties, and the film strength after printing. The hardening agents include organic hardening agents comprising boric acid, borax. Therefore, it would have been obvious to one of ordinary skill in the art to modify the ink jet of Kojima to further include boric acid for the purpose of improving the various aforementioned properties as taught by Kasahara as cited above.

Claims 1, 10, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,677,067 to Kojima et al., in view of USPN 5612281 to Kobayashi et al., and further in view of USPN 6,183,851 to Mishima.

Kojima discloses several examples of ink jet recording sheets (printing material) comprising a base paper covered on both sides by a polyolefin resin of low and high density polyethylene (same polymers as applicant uses) at col. 7, lines 40-44, with the polyolefin resin-coated paper support (base) having a thickness of 50-300 microns (see col. 7, line 35), where a

thickness of the resin coated layer has a thickness of 5-50 microns (see col. 7, line 67), meeting the requirements of claim 1 values of 8 or more and less than 20 microns. The recording sheet further comprises an ink receptive layer on either one or both sides of the paper (see col. 4, lines 50-54), containing inorganic fine particles of antistatic agents or pigments like silica (see col. 4, line 41; col. 5, line 66; col. 13, line 67), a hydrophilic binder of polyvinyl alcohol, and an amphoteric surfactant in an amount of 0.1 to 5% by weight at col. 7, lines 15-19 meeting the limitations of claims 1 and 8 at col. 9, lines 20-32. Kojima further discloses the polyethylene resins used on the base paper may be a low-density polyethylene, a medium-density polyethylene, a high-density polyethylene or a mixture thereof and further explains the low-density polyethylene has a density of 0.915-0.930 g/cm^3 and the high-density polyethylene has a density of 0.950 g/cm^3 or higher and depending on how the polyethylene resins are used, alone or in combination, it is possible to have different densities at col. 5, lines 15-21. Since the polymer resins of claim 1 are the same and have a base paper covered in the same polyolefin resin on both sides of the paper (this is equivalent to the polyolefin resin layer at the opposite surface) with the same thickness as per instant claim 1, ranging between 50-300 microns at col. 4, lines 58-62 and at col. 5, lines 31-35 the thickness of the resin coated paper on only one side or both sides is between 5-50 microns, which is included in applicant's claimed range of 5-50 microns; therefore, the relation equation {(B+C)/A} will equal 0.15 to 0.45 or 0.2 to 0.4 (to new instant claim 15), and the ratio of polyolefin resin layer thicknesses on or opposite the ink receptive layer surface of claim 1 will be less than 1. With regards to the base paper density between 0.60 and 1.05 g/m^3, Kojima teaches a support may be of woodfree paper, nonwoven fabrics, or natural pulp (same as applicants) at col. 9, lines 8-15 and col. 10, lines 38-53. Such a property as the

density of the base paper is result effective and therefore optimizable. Basis weight and thickness directly effect density. Essentially, the thicker the paper, the higher the density, and if one so desires to manufacture a base paper between 0.60 and 1.05 g/m^3, one would definitely be motivated by obvious reasons such as cost, a thinner paper will provide a cost savings. See further reference of Ohbayashi to ink jet recording sheets teaching density of papers may very well range between 0.60 and 1.05 g/cm^3, (also referring to new claim 20) at col. 4, lines 5-7 Ohbayashi teaches paper density between 0.70 to 1.2 g/cm^3. Also, Kojima teaches the base paper may be calendered to improve surface smoothness at col. 10, lines 50-55. It would have been obvious to one of ordinary skill in the art to modify the paper of Kojima to include paper having a density between 0.60 and 1.05 g/cm^3, because Ohbayashi teaches density of the paper is conventional for ink jet papers as cited above.

Kojima fails to expressly disclose fumed silica in an amount of 50 to 90 % by weight, as per amended claim 1 or new claim 17 from 13 to 30 g/m^2 (assuming the inorganic particle is silica), and Kojima is further silent to fumed silica having a particle size of 5 nm to 50 nm as in amended claim 1 or 5 to 20nm (claim 10 or new instant claim 16). Kobayashi, an analogous art, teaches processing inorganic fine inorganic silica in a dry process to produce "fumed silica". Kobayashi explains using a flame hydrolysis process in which silicon halide is hydrolyzed in a high-temperature gas phase to obtain silica containing no water, and an arc process in which siliceous sand and coke are heated, reduced and vaporized by means of arc in an electric furnace, followed by oxidizing with air, to obtain anhydrous silica at col. 6, lines 27-39. The silica fine particles are 3 to 10 nm and 10 to 100 nm, shown in col. 5, line 50 and col. 6, lines 56-57. This is in applicant's claimed range of 5 to 20 nm, as in claims 10 and new claim 16. Further

regarding claim 10, Kobayashi teaches a BET in the range of 100 to 250 m2/g, meeting Applicant's range of 100 to 400 m2/g. It would have been obvious to one of ordinary skill in the art to modify Kojima's ink jet recording sheet to include fumed silica size of 5 to 20 nm because Kobayashi teaches fumed silica easily forms a three-dimensional structure having particularly high void volume which is required for excellent ink absorptivity (col. 5, lines 1-15). See also Comparative Example 3 and Example 1 providing conventional weight percentage fumed silica falling within Applicant's claimed range. Further, it would have been obvious to one of ordinary skill in the art to further optimize the amount of particles added to provide fumed silica in the amount of 50 to 90 wt. % as in claim 5, and in claim 1 because Kobayashi teaches fumed silica is required for excellent ink absorptivity (col. 5, lines 1-15) and teaches using conventionally 50 and 75 wt. % fumed silica as in Example 1 and Comparative Example 3. Further Kobayashi explains silica is a major component within a color-receptive layer at col. 8, lines 32-35.

In regards to the amount of inorganic fine particles from 10 to 35 g/m2 or 13-30 g/ m2 as in claims 1 and 17, Kojima does not teach. However, Mishima teaches an ink jet image recording medium. At col. 11, lines 34-37 teaches inorganic pigments are added singly or in admixture in an amount between 0.1 to 20 g/m2, falling within Applicant's range. See also col. 9, lines 30-35 teaching inorganic pigment weight percentage between 5 and 95 wt. % (falling within Applicant's range). The preferred inorganic pigment of Mishima is fumed silica, see col. 8, lines 34-38. It would have been obvious to one of ordinary skill in the art to employ inorganic pigment and/or fumed silica in a coating amount as recited in the claims because Mishima teaches the coating amounts are conventional to use as cited above.

Claims 18-20 (new) are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,677,067 to Kojima et al., in view of USPN 5612281 to Kobayashi et al., USPN 6,183,851 to Mishima, and further in view of USPN 6,436,515 to Ohbayashi et al.

Kojima is relied upon above. Kojima does not provide for the water content percentage between 5 and 9% by weight as new instant claims 18-19 require. Ohbayashi teaches moisture content (equivalent to water content functionality) of a base paper is between 4 to 10 percent by weight in the core paper. See col. 5, lines 6-7. The base paper of Ohbayashi is also a resin-coated paper (see col. 4, lines 49-50). Such teaching provides motivation to combine with Kojima's resin-coated paper. It would have been obvious to one of ordinary skill in the art to modify the paper of Kojima to include a water content percentage because Ohbayashi provides this teaching is utilized in resin-coated paper as a conventional property for papers of the similar density.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,677,067 to Kojima et al., in view of USPN 5612281 to Kobayashi et al., USPN 6,183,851 to Mishima, USPN 6,436,515 to Ohbayashi et al., and further in view of USPN 6,165,606 to Kasahara et al.

Kojima is relied upon above, but is silent to adding boric acid as instant claim 13. Kasahara teaches at col. 15, lines 5-20 the ink-jet recording layer sheet with a void-containing layer, has a hardening agent that is cross-linkable with the hydrophilic binder polyvinyl alcohol, to improve the film forming properties of avoid-containing layer, the water-resisting properties, and the film strength after printing. The hardening agents include organic hardening agents comprising boric acid, borax. Therefore, it would have been obvious to one of ordinary skill in

the art to modify the ink jet of Kojima to further include boric acid for the purpose of improving the various aforementioned properties as taught by Kasahara as cited above.

Response to Arguments

5. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection. Kojima is still used to provide for the base resin coated paper, inorganic pigments, and thickness requirements. Kobayahsi is still used to provide for fumed silica and the size and weight. Kasahara is still used to teach the use of boric acid in ink jet media.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tamra L. Dicus whose telephone number is 571-272-1519. The examiner can normally be reached on Monday-Friday, 7:00-4:30 p.m., alternate Fridays. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

February 25, 2004 [tld]

CYNTHIA H. KELLY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700